

PAGE: 1

RAW SEQUENCE LISTING  
PATENT APPLICATION US/09/373,272

DATE: 08/31/1999  
TIME: 14:20:39

Input Set: I373272.RAW

This Raw Listing contains the General Information  
Section and up to first 5 pages.

ENTERED

1 <110> APPLICANT: Austin-Phillips, Sandra  
2 Burgess, Richard D  
3 German, Thomas L  
4 Ziegelhoffer, Thomas  
5 <120> TITLE OF INVENTION: Transgenic Plants as an Alternative Source of  
6 Lignocellulosic-Degrading Enzymes  
7 <130> FILE REFERENCE: Transgenic Plants Expressing Cellulase  
8 <140> CURRENT APPLICATION NUMBER: US/09/373,272  
9 <141> CURRENT FILING DATE: 1999-08-12  
10 <150> EARLIER APPLICATION NUMBER: 08/883,495  
11 <151> EARLIER FILING DATE: 1997-06-26  
12 <160> NUMBER OF SEQ ID NOS: 32  
13 <170> SOFTWARE: PatentIn Ver. 2.0  
14 <210> SEQ ID NO 1  
15 <211> LENGTH: 1621  
16 <212> TYPE: DNA  
17 <213> ORGANISM: Thermomonospora fusca  
18 <400> SEQUENCE: 1  
19 cgatatggat gatctgacgt ctgaatcccc ttgtcaccct agacattcac ccattttgtc 60  
20 gctttttacgg ctttcttttg gagttctccg tttcaccaag gaacaaaacc gcaacggaga 120  
21 gtaggcgcgg tctttacagc tcccttgcca atggttatcg tccgaacgga aaacgatctg 180  
22 ggagcgcctc cagccatgcg ctccctctcg tgccctcac ttcttttgag ccttgtgtc 240  
23 gttaggagcc ccgaatgtcc ccagacctc ttcgcgctct tctgggcgcc gcggcggcgg 300  
24 ccttggtcag cgcggctgct ctggccttcc ggtcgcaagc ggcgccaat gattctccgt 360  
25 tctacgtcaa cccaacatg tcttcgcggc aatgggtgcy gaacaacccc aacgacccgc 420  
26 gtaccccggt aatccgcgac cggatcgcca gcgtgccgca gggcacctgg ttcgcccacc 480  
27 acaaccccg gacgatcacc ggccagatcg acgcgctcat gagcgccgcc caggccgccg 540  
28 gcaagatccc gatcctggtc gtgtacaacg ccccgggcgg cgactgcggc aaccacagca 600  
29 gcggcggcgc cccagtcac agcgcctacc ggtcctggat cgacgaattc gctgccggac 660  
30 tgaagaaccg tcccgccac atcatcgctg ggccggacct gatctcgctg atgtcgagct 720  
31 gcatccagca cgtccagcag gaagtccctg agacgatggc gtacgcgggc aaggccctca 780  
32 aggccgggtc ctgcaggcg cggatctact tcgacgcggc ccaactccgcg tggcactcgc 840  
33 ccgcacagat ggcttctctg ctccagcagg ccgacatctc caacagcgcg cacggtatcg 900  
34 ccaccaacac ctccaactac cgggtggacc ctgacgaggt cgcctacgcc aaggcgggtg 960  
35 tctcggccat cggcaacccg tccctgcgcg cgggtcatcg caccagccgc aacggcaacg 1020  
36 gccccgcccg taacgagtgg tgcgaccca gcggacgcgc catcggcacg cccagcacca 1080  
37 ccaacaccgg cgacccgatg atcgacgcct tctgtggat caagctgccg ggtgaggccg 1140  
38 acggctgcat cgcggcgccc ggccagttcg tcccgcaggc ggccctacgag atggcgatcg 1200  
39 ccgcgggcgg caccaacccc aacccgaacc ccaacccgac gcccaccccc actccgaccc 1260  
40 ccacgcgcc tcccggtccc tcgggggctg gcacggcgac gtacacgatc gccaacgagt 1320  
41 ggaacgacgg cttccaggcg accgtgacgg tcaccgcgaa ccagaacatc accggctgga 1380  
42 ccgtgacatg gaccttcacc gacggccaga ccatcaccaa cgcttggaac gccgacgtgt 1440  
43 ccaccagcgg ctctcggtg accgcgcgga acgtcgcca caacggaaacg ctctcccagg 1500  
44 gagccccac agagttcggc ttctcggtc ctaagggcaa ctccaactct gttccgaccc 1560

PAGE: 2

# RAW SEQUENCE LISTING PATENT APPLICATION US/09/373,272

DATE: 08/31/1999

TIME: 14:20:59

Input Set: I373272.RAW

```

45      ttacctgctc cgccagctga cccctcctgg cagtgcactg ggtggcttag gcgtgctggg 1620
46      g 1621
47      <210> SEQ ID NO 2
48      <211> LENGTH: 3503
49      <212> TYPE: DNA
50      <213> ORGANISM: Thermomonospora fusca
51      <400> SEQUENCE: 2
52      cggcgatccc cctcatcatt caggtgcggt tagttcccc aggctaccga ggaccgaatt 60
53      tcggtccgtt tttcttgctg cgagccctga gaccgtttcc tgttccgttc cgtcaccatc 120
54      cttgcgcgtc ccggcggagg ggggaagcac cccgcgagat ggctccgcca cggcctgttt 180
55      ccgacccccg tcacaaaagc ccatttaacg cggattttac aaccggtcac gaagtggcta 240
56      ctctcttttg ggagcgtcc cgtgccgcta gtcacactgg gacgtgaatg gcgtcacggt 300
57      agggctcgtc gtgtgacacg cattttcgac cctgctttta gtccctaagt gggagcgtc 360
58      ccagccttcg ggagaactcc cacacaacca accgtccgac gccactctcc cagcgtcaa 420
59      acggaggcag cagtgttcac catccccgc tcccctccgg ggcccccggc cgtcgtccgc 480
60      gcaaccaccc cgaccggtcg gctgaacact gcagcgtccg gttctcgacc atccccttgc 540
61      gagagaacat cctccaacca aggaagacac cgatatgagt aaagtctctg ccacgaacag 600
62      acgttcgttg atgcggcgcg ggctggcagc cgctctgga ctggcgcttg gcgcctccat 660
63      ggtggcgctt gctgctccgg ccaacgcgc cggtgctcg gtgtactaca cggtaactc 720
64      ctggggtacc gggttcacgg ccaacgtcac catcaccaac ctgggcagtg cgatcaacgg 780
65      ctggaccctg gagggggact tccccggcaa ccagcaggtg accaacctgt ggaacggggac 840
66      ctacaccagc tccgggcagc acgtgtcggg cagcaacgcc ccgtacaacg cctccatccc 900
67      ggccaacgga acggttgagt tggggttcaa cggctcctac tggggcagca acgacatccc 960
68      ctccctcttc aagctgaacg gggttacctg cgacggctcg gacgaccccg accccgagcc 1020
69      cagccctctc cccagccctt cccccagccc cacagaccgg gatgagccgg gcggcccgac 1080
70      caaccgcgcc accaaccggc gcgagaaggt cgacaacccg ttcgagggcg ccaagctgta 1140
71      cgtgaacccg gtctggtcgg ccaaggccgc cgctgagccg ggccggttcg cggtcgcaa 1200
72      cgagtcaccg gctgtctggc tggaccgtat cggcgggacg gagggcaacg acagcccgac 1260
73      caccggctcc atgggtctgc gcgaccacct ggaggaggcc gtccgccagt ccggtggcga 1320
74      cccgctgacc atccaggctg tcatctacca cctgcccgcc cgcgactcgc ccgcgtggc 1380
75      ctccaacggt gagctgggtc ccgatgaact cgaccgctac aagagcgagt acatcgaccc 1440
76      gatcgccgac atcatgtggg acttcgcaga ctacgagaac ctgcggatcg tcgccatcat 1500
77      cgagatcgac tccctgcccc acctcgtcac caacgtgggc gggaacggcg gcaccgagct 1560
78      ctgcgcctac atgaagcaga acggcggcta cgtcaacggt gtcggctacg cctccgcaa 1620
79      gctgggcgag atcccgaacg tctacaacta catcgacgcc gccaccacg gctggatcgg 1680
80      ctgggactcc aacttcggcc cctcgggtga catcttctac gaggccgcca acgcctccgg 1740
81      ctccaccgtg gactacgtgc acggcttcat ctccaacacg gccaaactact cggccactgt 1800
82      ggagccgtac ctggacgtca acggcacctg taacggccag ctcatccgcc agtccaagt 1860
83      ggttgactgg aaccagtacg tcgacgagct ctccctcgtc caggacctgc gtcaggccct 1920
84      gatcgccaag ggcttcgggt ccgacatcgg tatgtctatc gacacctccc gcaacggctg 1980
85      ggggtggccc aaccgtccga ccggaccgag ctccctccacc gacctcaaca cctacgttga 2040
86      cgagagccgt atcgaccgcc gtatccaccc cggtaactgg tgcaaccagg ccggtgcggg 2100
87      cctcggcgag cggccacgg tcaacccggc tcccgtgtt gacgcctacg tctgggtgaa 2160
88      gccccgggt gagtccgacg gcgcccagca ggagatccc aacgacgagg gcaagggtt 2220
89      cgaccgcatg tgcgaccgca cctaccagg caacgcccgc aacggcaaca acccctcgga 2280
90      tgcgctgccc aacgccccca tctccggcca ctggttctct gccagttcc gcgagctgct 2340
91      ggccaacgcc taccgcctc tgtaaagcgg agtgaggcaa cggctgacag cctcaacgag 2400
92      gaactgatca gcacctcta gccggagacg gcgcccgtcc actccccgtg ggcggggcgc 2460
93      gcttttatgc cgaccgtgc cccagccgca aggggcacgg gtcggcctat tccggcgatg 2520
94      tcggtcacgt cgccctagca cccggaaacg ccgagaaaga ctgccccgaa acggtcctct 2580

```

PAGE: 3

RAW SEQUENCE LISTING  
PATENT APPLICATION US/09/373,272

DATE: 08/31/1999

TIME: 14:20:59

Input Set: I373272.RAW

```

95      cccatccctg cattaggttg gccgagtcg cctatggctt cgtggggcgg aacccaaccc 2640
96      accatcaacg agaggtatca ccatggccag tgtggtgaaa ttcaatgtgc tgacggttcc 2700
97      tccccggtgcc ggcgccaccc cggaggacgt ttgccaaagc cgcaggcctc gtggagaacc 2760
98      gggccggggtt tcacgagttc caactgccgg cgcccggcga cgggacggac aagtacatcg 2820
99      tctacacgcg ctggcgctcc ggagaggact accagaactg gctgaacagc gaggccttcc 2880
100     agcgcggaaca cgcccaggcc tctgaagact cccgcccagc cagccagggc ggcccggcgg 2940
101     cgtccgcgag tgaactctgg tccttcgaag tcgtccagca cgtccaggcc caggactgat 3000
102     cccggtgcgg ccctcggttc tttaccgggg gccgcccacc cccttcatcc cttttcttct 3060
103     cccccgcacc ctttttgatc tgcaatgatg gaattcgaga ttcttgagaa ggccgatcgt 3120
104     gtccatgacc gcgcagaagg caggacgacc acgcgtaccg gtcgacatcg aaggagtcaa 3180
105     ctgacagtgg ggactatcgc ggggctgatt gtcgcgctgt caggcgtggg gatggctcgc 3240
106     gccaacgtgc tcccgtagga accgtcggac ccggcatccg tgggtcccgc cacctcgagc 3300
107     ggcagcagtt ctcccatgac gccggagccc tcgcgtcccc ggtaccccca ctcggtcgct 3360
108     ccgtggtcga agaggtgccc agcgcaagcg gagaactgcg ggtcgtcgaa ggtgacgggg 3420
109     aggtcgtcgg cgaaggcacg ctctgcgct acctggtgga ggtcgaagaa gggcttcccg 3480
110     gagacccgcg cgacttcgct gca                                     3503

```

```

111 <210> SEQ ID NO 3
112 <211> LENGTH: 21
113 <212> TYPE: PRT
114 <213> ORGANISM: Artificial Sequence
115 <220> FEATURE:
116 <223> OTHER INFORMATION: Description of Artificial Sequence: VSP Leader
117      Sequence
118 <400> SEQUENCE: 3
119      Met Lys Leu Phe Val Phe Phe Val Ala Ala Val Val Leu Val Ala Trp
120      1             5             10             15
121      Pro Cys His Gly Ala
122      20

```

```

123 <210> SEQ ID NO 4
124 <211> LENGTH: 25
125 <212> TYPE: DNA
126 <213> ORGANISM: Artificial Sequence
127 <220> FEATURE:
128 <223> OTHER INFORMATION: Description of Artificial Sequence: Xba E2 PCR
129      Primer
130 <400> SEQUENCE: 4
131      gctctagatg aatgattctc cgttc                                     25

```

```

132 <210> SEQ ID NO 5
133 <211> LENGTH: 17
134 <212> TYPE: DNA
135 <213> ORGANISM: Artificial Sequence
136 <220> FEATURE:
137 <223> OTHER INFORMATION: Description of Artificial Sequence: Xba E2 PCR
138      Primer
139 <400> SEQUENCE: 5
140      tgaccggcag caaaatg                                             17

```

```

141 <210> SEQ ID NO 6
142 <211> LENGTH: 25
143 <212> TYPE: DNA
144 <213> ORGANISM: Artificial Sequence

```

PAGE: 4

# RAW SEQUENCE LISTING PATENT APPLICATION US/09/373,272

DATE: 08/31/1999

TIME: 14:20:59

Input Set: I373272.RAW

```

145 <220> FEATURE:
146 <223> OTHER INFORMATION: Description of Artificial Sequence: Xba E3 PCR
147     Primer
148 <400> SEQUENCE: 6
149     gctctagatg gccggctgct cgggtg                                     25
150 <210> SEQ ID NO 7
151 <211> LENGTH: 23
152 <212> TYPE: DNA
153 <213> ORGANISM: Artificial Sequence
154 <220> FEATURE:
155 <223> OTHER INFORMATION: Description of Artificial Sequence: RIE3 PCR
156     Primer
157 <400> SEQUENCE: 7
158     ggaattctta cagaggcggg tag                                           23
159 <210> SEQ ID NO 8
160 <211> LENGTH: 3004
161 <212> TYPE: DNA
162 <213> ORGANISM: Acidothermus cellulolyticus
163 <300> PUBLICATION INFORMATION:
164 <400> SEQUENCE: 8
165     ggatccacgt tgtacaaggt cacctgtccg tcgttctggt agagcggcgg gatggtcacc 60
166     cgcacgatct ctctttgtt gatgtcgacg gtcacgtggt tacggtttgc ctggcgcgg 120
167     attttcgcgc tcgggcttgc tccggctgtc ggggttcggtt tggcgtgggtg tgcggagcac 180
168     gccgaggcga tcccaatgag ggcaagggca agagcggagc cgatggcacg tcgggtggcc 240
169     gatggggtac gccgatgggg cgtggcgtcc ccgcccgga cagaaccgga tgcggaatag 300
170     gtcacgggtgc gacatgttgc cgtaccgcgg acccggtatga caagggtggg tgcgcgggtc 360
171     gcctgtgagc tgccggctgg cgtctggatc atgggaacga tcccaccatt ccccgcaatc 420
172     gacgcgatcg ggagcagggc ggccgcgagcc ggaccgtgtg gtcgagccgg acgattcgcc 480
173     catacgggtgc tgcaatgccc agcgccatgt tgtcaatccg ccaaatgcag caatgcacac 540
174     atggacaggg attgtgactc tgagtaatga ttggattgcc ttcttgccgc ctacgcgtta 600
175     cgcagagtag gcgactgtat gcggtagggt ggcgctccag ccgtgggctg gacatgcctg 660
176     ctgcgaactc ttgacacgtc tggttgaacg cgcaatactc ccaacaccga tgggatcggt 720
177     cccataagtt tccgtctcac aacagaatcg gtgcgccttc atgatcaacg tgaaaggagt 780
178     acggggggaga acagacgggg gagaaaccaa cgggggattg gcggtgccgc gcgcattgcy 840
179     gcgagtgcct ggctcgcggg tgatgctgcg ggtcggcgtc gtcgtcgcgg tgctggcatt 900
180     ggttgccgca ctgcgaacc tagccgtgcc gcggccggct cgcgcccgcg gcggcggtta 960
181     ttggcacacg agcggccggg agatcctgga cgcgaacaac gtgccggtac ggatcgccgg 1020
182     catcaactgg tttgggttcg aaacctgcaa ttacgtcgtg cacggtctct ggtcacgcga 1080
183     ctaccgcagc atgctcgacc agataaagtc gtcggtctac aacacaatcc ggctgccgta 1140
184     ctctgacgac attctcaagc cgggcaccat gccgaacagc atcaattttt accagatgaa 1200
185     tcaggacctg cagggtctga cgtccttgca ggtcatggac aaaatcgtcg cgtacgccgg 1260
186     tcagatcggc ctgcgcatca ttcttgaccg ccaccgaccg gattgcagcg ggcagtcggc 1320
187     gctgtggtac acgagcagcg tctcgaggc tacgtggatt tccgacctgc aagcgtggc 1380
188     gcagcgctac aagggaacc cgacggctcg cggttttgac ttgcacaacg agccgcagta 1440
189     cccggcctgc tggggctgcg gcgatccgag catcgactgg cgattggccg ccgagcgggc 1500
190     cggaacgcc gtgctctcgg tgaatccgaa cctgctcatt ttgctcgaag gtgtgcagag 1560
191     ctacaacgga gactcctact ggtggggcgg caacctgcaa ggagccggcc agtaccgggt 1620
192     cgtgctgaac gtgccgaacc gcctggtgta ctcggcgcac gactacgcga cgagcgtcta 1680
193     cccgcagacg tggttcagcg atccgacctt ccccaacaac atgcccgga tctggaacaa 1740
194     gaactgggga tacctcttca atcagaacat tgcaccggtg tggctgggcy aattcggtac 1800

```

PAGE: 5

RAW SEQUENCE LISTING  
PATENT APPLICATION US/09/373,272

DATE: 08/31/1999

TIME: 14:20:59

Input Set: I373272.RAW

```

195      gacactgcaa tccacgaccg accagacgtg gctgaagacg ctctgtccagt acctacggcc 1860
196      gaccgcgcaa tacggtgcgg acagcttcca gtggaccttc tggctcctgga accccgattc 1920
197      cggcgacaca ggaggaattc tcaaggatga ctggcagacg gtcgacacag taaaagacgg 1980
198      ctatctcgcg ccgatcaagt cgtcgatttt cgatcctgtc ggcgcgctctg catcgccctag 2040
199      cagtcaaccg tccccgtcgg tgtcgccgtc tccgtcgccg agcccgctcg cgagtcggac 2100
200      gccgacgcct actccgacgc cgacagccag cccgacgcca acgctgaccc ctactgctac 2160
201      gcccacgccc acggcaagcc cgacgcccgc accgacggca gcctccggag cccgctgcac 2220
202      cgcgagttac caggtcaaca gcgattgggg caatggcttc acggtaacgg tggccgtgac 2280
203      aaattccgga tccgtcgcca ccaagacatg gacggtcagt tggacattcg gcgaaatca 2340
204      gacgattacc aattcgtgga atgcagcggc cagcgagaac ggtcagtcgg taacggctcg 2400
205      gaatatgagt tataacaacg tgattcagcc tggtcagaac accacgttcg gattccaggc 2460
206      gagctatacc ggaagcaacg cggcaccgac agtcgcctgc gcagcaagtt aatacgctcg 2520
207      ggagccgacg ggagggctcg gaccgtcggc tccccggctt ccacctatgg agcgaaccca 2580
208      acaatccgga cggaactgca ggtaccagag aggaacgaca cgaatgcccc ccatctcaaa 2640
209      acggctgcga gccggcgctc tcgccggggc ggtgagcatc gcagcctcca tcgtgccgct 2700
210      ggcgatgcag catcctgcca tcgccgcgac gcacgtcgac aatccctatg cgggagcgac 2760
211      cttcttcgtc aaccgctact gggcgcaaga agtacagagc gaacggcgaa ccagaccaat 2820
212      gccactctcg cagcgaaaat gcgcgtcggt tccacatatt cgacggccgt ctggatggac 2880
213      cgcacgcgtg cgatcaacgg cgtcaacggc ggacccggct tgacgacata tctggacgcc 2940
214      gccctctccc agcagcaggg aaccaccctt gaagtcattg agattgtcat ctacgatctg 3000
215      ccgg                                     3004
216      <210> SEQ ID NO 9
217      <211> LENGTH: 2220
218      <212> TYPE: DNA
219      <213> ORGANISM: Trichoderma reesei
220      <300> PUBLICATION INFORMATION:
221      <308> DATABASE ACCESSION NUMBER: Genbank E00389
222      <309> DATABASE ENTRY DATE: 1997-09-29
223      <310> PATENT DOCUMENT NUMBER: JP 1985149387-A1
224      <312> PUBLICATION DATE: 1985-08-06
225      <400> SEQUENCE: 9
226      aaggttagcc aagaacaata gccgataaag atagcctcat taaacggaat gagctagtag 60
227      gcaaagtcag cgaatgtgta tatataaagg ttcgaggtcc gtgcctccct catgctctcc 120
228      ccactctact atcaactcag atcctccagg agacttgtag accatctttt gaggcacaga 180
229      aacccaatag tcaaccgcgg actggcatca tgtatcgga gttggccgtc atcacggcct 240
230      tcttgccac agctcgtgct cagtcggcct gcactctcca atcggagact caccgcctc 300
231      tgacatggca gaaatgctcg tctggtggca cttgactca acagacaggc tccgtggtca 360
232      tcgacgcaa ctggcgctgg actcacgcta cgaacagcag cacgaactgc tacgatggca 420
233      acacttgag ctgacccta tgtctgaca acgagacctg cgcgaagaac tgctgtctgg 480
234      acggtgcgc ctacgcgtcc acgtacggag ttaccacgag cggtaacagc ctctccattg 540
235      gctttgtcac ccagtctgcg cagaagaacg ttggcgctcg cctttacctt atggcgagcg 600
236      acacgaccta ccaggaattc accctgcttg gcaacgagtt ctctttcgat gttgatgttt 660
237      cgcagctgcc gtaagtgact taccatgaac ccctgacgta tcttcttggt ggctcccagc 720
238      tgactggcca atttaagggt cggttggaac ggagctctct acttcgtgtc catggacgcg 780
239      gatggtggcg tgagcaagta tcccaccaac aacgctggcg ccaagtacgg cacggggtac 840
240      tgtgacagcc agtgtcccc cgatctgaag ttcatcaatg gccaggccaa cgttgagggc 900
241      tgggagccgt catccaacaa cgcaaacacg ggcattggag gacacggaag ctgctgctct 960
242      gagatggata tctgggaggg caactccatc tccgaggtc ttacccccca cccttgacg 1020
243      actgtcggcc aggagatctg cgagggtgat ggggtcggcg gaacttactc cgataacaga 1080
244      tatggcggca cttgcgatcc cgatggctgc gactggaacc cataccgcct gggcaacacc 1140

```

PAGE: 6

**VERIFICATION SUMMARY**  
**PATENT APPLICATION US/09/373,272**

DATE: 08/31/1999  
TIME: 14:20:59

Input Set: I373272.RAW

Line ? Error/Warning

Original Text